

BRUSH CREEK SUBSTATION - TREND STUDY NO. 9-24-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Year-Long (Fawning habitat), Crucial Elk Winter

NRCS Ecological Site Description: Semidesert Loam (Wyoming Big Sagebrush), R034XY212UT

Land Ownership: BLM

Elevation: 5845 ft. (1782 m)

Aspect: South

Slope: 2%

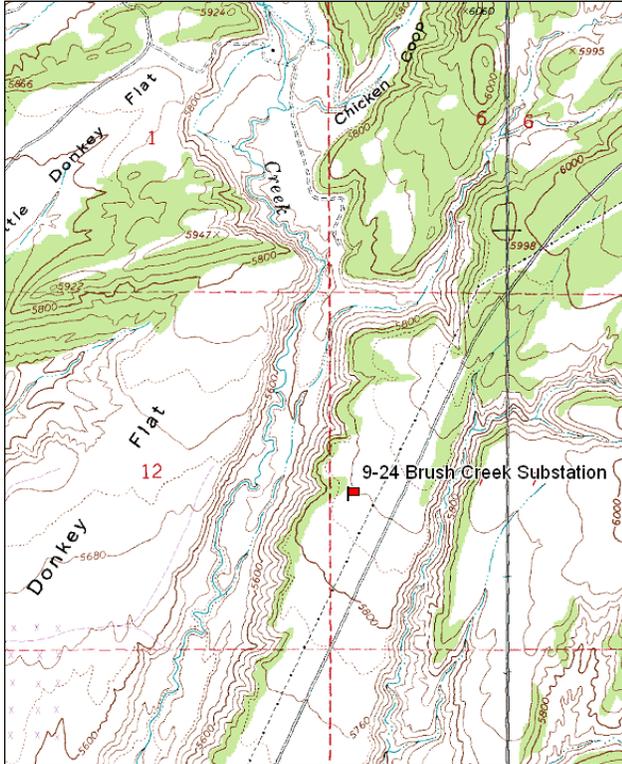
Transect bearing: 4° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft)

Directions:

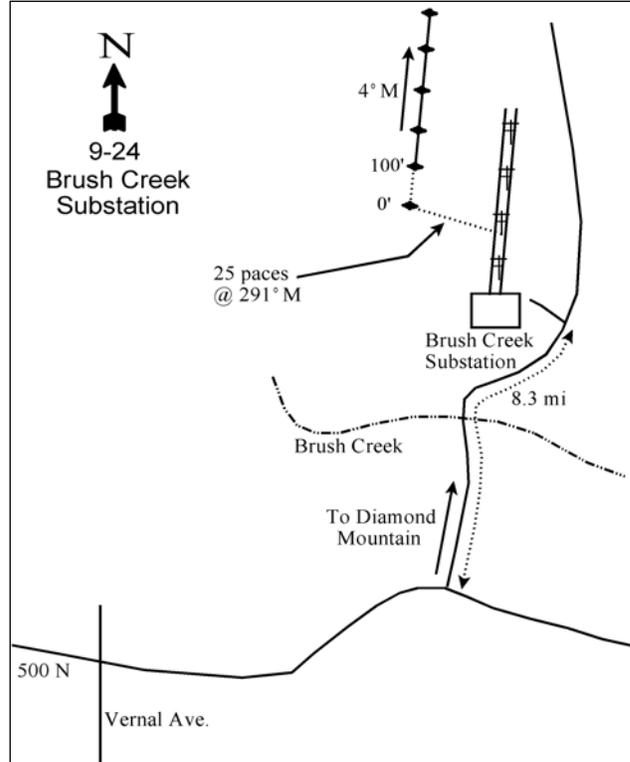
From the intersection of Vernal Avenue and 500 North in Vernal, head east on 500 North. Turn north on the road that leads to Diamond Mountain. Drive 8.3 miles to a short road on the left that leads to the Brush Creek Substation. Turn north and follow the power lines to the second set of power poles to power pole number 28/4. From the western most pole walk 25 paces at 291°M to the 0-foot stake, which is marked with browse tag number #61.

Map Name: Jensen Ridge



Township: 3S Range: 23E Section: 7

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 636706 E 4492739 N

BRUSH CREEK SUBSTATION - TREND STUDY NO. 9-24

Site Information

Site Description: The study samples a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) community on land managed by the Bureau of Land Management (BLM) within the S.J. Hatch grazing allotment. The area to the east of the site was treated with the herbicide Plateau, a Dixie harrow and aerial seeding (Table - Seed Mix) as part of the Brush Creek Bench Sage Restoration ([WRI Project #315](#)) in the fall of 2008. It appears that the last belt of the transect may have been affected by the treatment. Pellet group transect data has indicated decreasing use by deer from very heavy use in 1997 to light use in 2010. Estimated use by elk and cattle has been light since 1997 (Table - Pellet Group Data).

Browse: Browse is limited on the site. Wyoming big sagebrush is the dominant browse species and provided abundant cover in 1997, but decreased substantially in cover in 2005 (Table - Browse Trends). This change in trend for sagebrush was also observed on the Buckhorn Canyon (9-25) study in this region. There was also a decrease in sagebrush density in 2005 with the surviving sagebrush being mostly decadent plants with poor vigor. Decadence and poor vigor decreased in 2010 with a large increase in the recruitment of young plants. Use of sagebrush was moderate to heavy in 1997 and 2005, but was light to moderate in 2010. The only other common browse on the site is a small population of pricklypear cactus (*Opuntia* sp.) (Table - Browse Characteristics).

Herbaceous Understory: Grasses are extremely poor on the site. The only species that provided notable cover was the annual species cheatgrass (*Bromus tectorum*), but it only occurred at moderately low cover. Only three perennial grasses were observed at low frequency and cover. These include bottlebrush squirreltail (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*) and needle-and-thread (*Stipa comata*). Forbs are diverse and abundant on the site. Perennial forbs were very rare at the outset of the study in 1997, but were exceptionally abundant in 2005. Perennial forbs returned to more moderate levels in 2010. Scarlet globemallow (*Sphaeralcea coccinea*) is the dominant forb with other common forbs being timber poisonvetch (*Astragalus convallarius*) and hoary aster (*Machaeranthera canescens*). Annuals forbs were also rare at the outset of the study, but have been abundant on the site since 2005, with many weedy species such as halogeton (*Halogeton glomerata*) and Russian thistle (*Salsola iberica*) (Table - Herbaceous Trends).

Soil: Soils have a sandy loam texture with a slightly alkaline soil reaction (pH 7.9) (Table - Soil Analysis Data). Bare ground cover is fairly high, especially in the shrub interspaces where some erosion is noticeable. Vegetation and litter cover are lacking on the site (Table - Basic Cover). Soil and litter movement was apparent with slight pedestals around shrubs. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1997 to 2005 - down (-2):** The density of Wyoming big sagebrush decreased by 84% from 8,240 plants/acre to 1,280 plants/acre and cover decreased from 16% to 3%. Decadence of sagebrush increased from 16% to 84% and poor vigor increased from 12% to 69%.
- **2005 to 2010 - up (+2):** Wyoming big sagebrush density increased nearly three-fold to 3,380 plants/acre though cover remained similar. Most of the increase in density was due to a substantial increase in the recruitment of young sagebrush plants, which increased to 47% of the population. Decadence of sagebrush decreased to 5% and poor vigor decreased to 1%. Despite the large increase, the sagebrush population is well below 1997 levels.

Grass:

- **1997 to 2005 - down (-1):** There was a 79% decrease in the sum of nested frequency of perennial grasses, but perennial grasses were already rare on the site. Cheatgrass is the dominant grass species on the site.
- **2005 to 2010 - slightly down (-1):** The sum of nested frequency of perennial grasses continued to decrease and perennial grasses were extremely rare on the site.

Forb:

- **1997 to 2005 - slightly up (+1):** The perennial forb sum of nested frequency increased nearly three-fold and cover increased from less than 1% to 23%. However, annual forbs also increased substantially on the site, many weedy species including halogeton and Russian thistle being sampled.
- **2005 to 2010 - down (-2):** The sum of nested frequency of perennial forbs decreased by 48% and cover decreased to 6%. Annual forbs also decreased in frequency, but increased in cover from 11% to 18%. The weedy species Russian thistle provided the majority of the forb cover on the site.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 9, study no: 24

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
97	20.2	10.2	1.0	1.9	-2.6	1.1	0.0	31.7	Fair
05	3.1	0.0	0.0	1.0	-2.7	10.0	0.0	11.4	Very Poor-Poor
10	3.1	0.0	0.0	0.6	-3.8	10.0	0.0	9.8	Very Poor-Poor

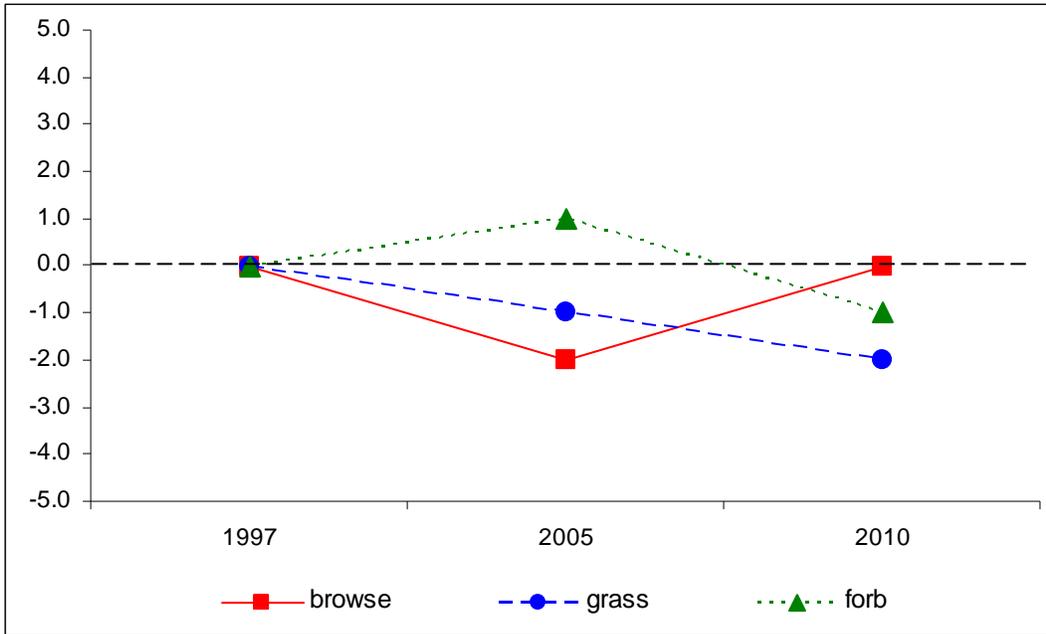
SEED MIX --

Management unit 9, study no: 24

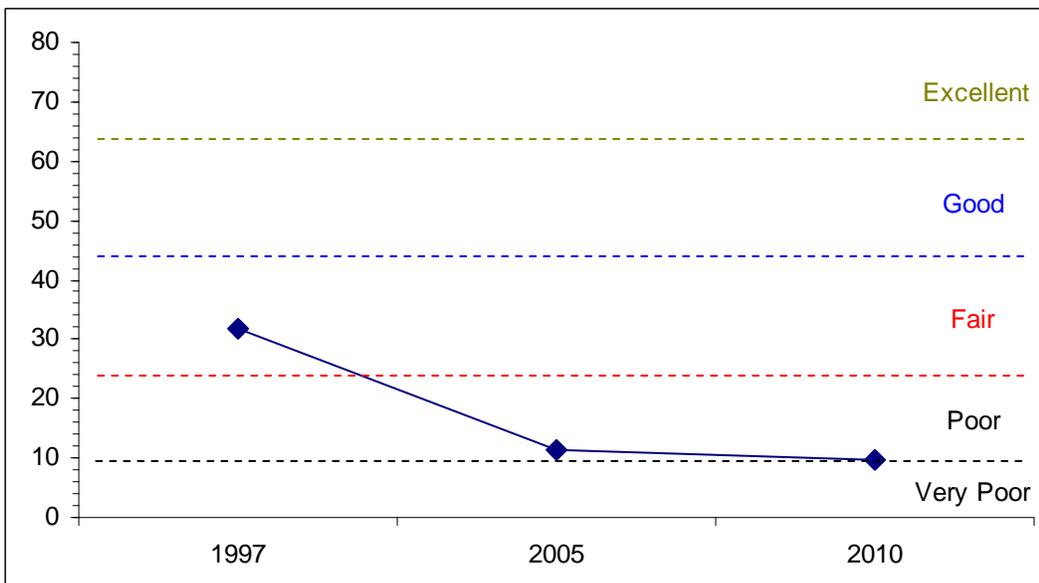
Project Name: Bench Creek Sage Restoration			
WRI Database #:315			
Application: Aerial		Acres: 300	
Seed type		lbs in mix	lbs/acre
F	Alfalfa 'Ladak'	600	2.00
G	Crested Wheatgrass 'Douglas'	450	1.50
G	Crested Wheatgrass 'Hycrest'	300	1.00
G	Russian Wildrye 'Bozoisky'	300	1.00
G	Sandberg Bluegrass	150	0.50
G	Snake River Wheatgrass 'Secar'	300	1.00
G	Thickspike Wheatgrass 'Critana'	300	1.00
B	Forage Kochia--Lander NV	300	1.00
B	Sagebrush, Wyoming--Sanpete UT	300	1.00
Total Pounds:		3000	10.00
PLS Pounds:			7.71

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 9, Study no: 24



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 9, Study no: 24



HERBACEOUS TRENDS--

Management unit 09, Study no: 24

Type	Species	Nested Frequency			Average Cover %		
		'97	'05	'10	'97	'05	'10
G	<i>Bromus tectorum</i> (a)	b ₂₉₂	a ₁₃₉	b ₃₄₆	3.46	3.54	5.13
G	<i>Oryzopsis hymenoides</i>	a ⁻	ab ₅	b ₁₂	-	.04	.17
G	<i>Sitanion hystrix</i>	c ₁₄₆	b ₂₃	a ₃	.92	.45	.06
G	<i>Stipa comata</i>	3	3	1	.03	.02	.06
Total for Annual Grasses		292	139	346	3.46	3.54	5.13
Total for Perennial Grasses		149	31	16	0.95	0.51	0.28
Total for Grasses		441	170	362	4.41	4.06	5.42
F	<i>Agoseris glauca</i>	-	1	-	-	.03	-
F	<i>Alyssum alyssoides</i> (a)	a ₆	b ₄₈	a ₁₀	.02	.91	.02
F	<i>Arabis</i> sp.	1	-	-	.00	-	-
F	<i>Arenaria</i> sp.	-	-	2	-	-	.00
F	<i>Astragalus convallarius</i>	28	46	33	.19	3.50	2.11
F	<i>Chaenactis stevioides</i>	a ⁻	b ₁₈	a ⁻	-	.42	-
F	<i>Chenopodium leptophyllum</i> (a)	a ₈	a ₂	b ₂₃	.01	.01	.07
F	<i>Collinsia parviflora</i> (a)	a ⁻	b ₂₇	a ⁻	-	.19	-
F	<i>Cryptantha</i> sp.	b ₁₅	a ₁	ab ₆	.03	.00	.19
F	<i>Descurainia pinnata</i> (a)	a ⁻	b ₁₄₇	a ₂	-	3.15	.01
F	<i>Eriogonum cernuum</i> (a)	a ₁	b ₃₃	a ₃	.00	.45	.03
F	<i>Eriogonum racemosum</i>	2	-	5	.06	.00	.03
F	<i>Gilia</i> sp. (a)	a ⁻	b ₃₇	a ⁻	-	.74	-
F	<i>Halogeton glomeratus</i> (a)	a ⁻	b ₅₁	b ₄₅	-	.48	1.20
F	<i>Lactuca serriola</i>	a ⁻	b ₂₄	a ⁻	-	.34	-
F	<i>Lappula occidentalis</i> (a)	a ₁₄	b ₁₃₄	a ₃₁	.03	2.14	.43
F	<i>Machaeranthera canescens</i>	a ₂₈	c ₁₁₆	b ₇₀	.07	3.91	.39
F	<i>Microsteris gracilis</i> (a)	-	-	2	-	-	.00
F	<i>Navarretia intertexta</i> (a)	a ⁻	b ₁₇	a ⁻	-	.35	-
F	<i>Phlox longifolia</i>	b ₁₃	ab ₉	a ₁	.03	.04	.00
F	<i>Plantago patagonica</i> (a)	-	6	-	-	.03	-
F	<i>Salsola iberica</i> (a)	a ⁻	b ₁₂₄	c ₂₅₂	-	2.22	16.42
F	<i>Sisymbrium altissimum</i> (a)	-	10	2	-	.38	.03
F	<i>Sphaeralcea coccinea</i>	a ₄₂	c ₁₉₅	b ₁₁₆	.13	13.68	3.19
F	<i>Townsendia</i> sp.	a ⁻	b ₄₁	4	-	.59	.03
Total for Annual Forbs		29	636	370	0.06	11.09	18.23
Total for Perennial Forbs		129	451	237	0.53	22.55	5.97
Total for Forbs		158	1087	607	0.59	33.64	24.21

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS--

Management unit 09, Study no: 24

Type	Species	Strip Frequency			Average Cover %		
		'97	'05	'10	'97	'05	'10
B	Artemisia tridentata wyomingensis	100	34	36	16.13	2.45	2.47
B	Opuntia sp.	9	12	6	.03	.33	.33
Total for Browse		109	46	42	16.17	2.78	2.81

CANOPY COVER, LINE INTERCEPT--

Management unit 09, Study no: 24

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	3.34	4.43

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 09, Study no: 24

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	2.3	1.3

BASIC COVER--

Management unit 09, Study no: 24

Cover Type	Average Cover %		
	'97	'05	'10
Vegetation	18.79	35.26	33.40
Rock	.46	.35	.05
Pavement	4.31	1.76	2.59
Litter	22.62	33.88	32.02
Cryptogams	5.05	1.14	.33
Bare Ground	44.67	38.60	41.37

SOIL ANALYSIS DATA --

Management unit 9, Study no: 24, Study Name: Brush Creek Substation

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
13.3	7.6	57.4	22.1	20.6	1.4	8.4	67.2	0.4

PELLET GROUP DATA--

Management unit 09, Study no: 24

Type	Quadrat Frequency			Days use per acre (ha)		
	'97	'05	'10	'97	'05	'10
Rabbit	9	26	6	-	-	-
Elk	16	1	1	12 (30)	1 (2)	1 (2)
Deer	61	46	24	154 (380)	45 (111)	21 (51)
Cattle	-	-	8	2 (5)	6 (14)	7 (16)

BROWSE CHARACTERISTICS--
Management unit 09, Study no: 24

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia tridentata wyomingensis</i>									
97	8240	2	82	16	-	56	42	12	14/25
05	1280	5	11	84	15000	36	61	69	13/18
10	3380	47	49	5	-	20	9	1	13/19
<i>Chrysothamnus nauseosus</i>									
97	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	23/29
<i>Gutierrezia sarothrae</i>									
97	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	17/12
<i>Opuntia sp.</i>									
97	180	0	89	11	-	0	0	11	4/11
05	260	0	62	38	-	0	0	23	4/14
10	140	0	100	0	-	0	14	29	6/13
<i>Sarcobatus vermiculatus</i>									
97	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	27/35